

Amendments to the Claims

Cancel Claims 1-6.

Claim 7 (currently amended): An exchange device comprising:

one or more thermoplastic hollow conduits fused at a first end portion of the thermoplastic hollow conduits to a first thermoplastic resin[[:]] and said first thermoplastic resin fused to one or more structures interconnected by slots on an interior surface of a first sleeve or to a first end of a thermoplastic housing in a unified terminal end block structure, said first end portion of said thermoplastic hollow conduits potted in the first thermoplastic resin; and

a second end portion of the thermoplastic hollow conduits fused at a second end portion of the one or more thermoplastic hollow conduits with a second thermoplastic resin[[:]] and said second thermoplastic resin fused to one or more structures interconnected by slots on an interior surface of a second sleeve or to a second end of the thermoplastic housing in a unified terminal end block structure, said second end portion of said thermoplastic hollow conduits potted in the second thermoplastic resin.

Claim 8 (original): The exchange device of claim 7 where the structures are protrusions, grooves, or a combination of these.

Claim 9 (currently amended): The exchange device of claim 7 where the structures are grooves in the surface of the first or second end of the housing or the structures are grooves in the surface of the first or second sleeves.

Claim 10 (currently amended): The exchange device of claim 7 wherein the device further comprises a sintered thermoplastic coating on the ~~inside~~ interior surface of the ~~sleeve~~ sleeves or housing.

Claim 11 (currently amended): The exchange device of claim [[7]] 9 wherein ~~said housing or sleeve includes fluid fittings~~ the thermoplastic hollow conduits are co-extruded hollow tubes.

Claim 12 (currently amended): The exchange device of claim 9 having two or more grooves in the housing or sleeves wherein said grooves are interconnected by vent channels and wherein the thermoplastic hollow conduits are perfluorinated co-extruded hollow tubes that are fused with the first or second thermoplastic resin that is a perfluorinated thermoplastic, said first or second thermoplastic is fused with the thermoplastic housing or said first and second sleeves that are a perfluorinated thermoplastic.

Claim 13 (previously presented): The exchange device of claim 7 wherein the thermoplastic hollow conduits are porous hollow fibers, skinned hollow fibers, co-extruded hollow conduits, or combinations of these.

Claim 14 (currently amended): The exchange device of claim 7 wherein [[the]] ends of the thermoplastic hollow conduits are opened to fluid flow.

Claim 15 (currently amended): The exchange device of claim [[7]] 9 wherein the thermoplastic hollow conduits, thermoplastic resin, and thermoplastic housing or said first or second sleeves ~~include~~ are [[a]] perfluorinated ~~thermoplastic~~ thermoplastics.

Claim 16 (currently amended): An exchange device comprising:

one or more co-extruded thermoplastic hollow conduits, said co-extruded thermoplastic hollow conduits have an inner thermoplastic layer fused to an outer thermoplastic layer, the outer thermoplastic layer of said co-extruded thermoplastic hollow conduits has a lower melting point temperature than the inner thermoplastic layer of said thermoplastic hollow conduits;

said one or more co-extruded thermoplastic hollow conduits fused at a first end portion of the thermoplastic hollow conduits to a first thermoplastic resin[[;]] and said first thermoplastic resin fused to [[a]] an interior surface of a first thermoplastic sleeve or to [[a]] an interior surface of a first end of a thermoplastic housing in a terminal end block

structure, said first end portion of said co-extruded thermoplastic hollow conduits potted in the first thermoplastic resin; and

said one or more co-extruded thermoplastic hollow conduits fused at a second end portion of the one or more co-extruded thermoplastic hollow conduits [[fused]] with a second thermoplastic resin[[:]] and said second thermoplastic resin fused to [[a]] an interior surface of a second thermoplastic sleeve or to an interior surface of a second end of the thermoplastic housing in a terminal end block structure, said second end portion of said co-extruded thermoplastic hollow conduits potted in the second thermoplastic resin.

Claim 17 (currently amended): The exchange device of claim 16 wherein [[the]] ends of the co-extruded thermoplastic hollow conduits of the terminal end block structure are opened to fluid flow.

Claim 18 (currently amended): The exchange device of claim 16 ~~wherein said housing or sleeve includes fluid fittings~~ that maintains fluid integrity for 24 hours with hot oil fed into a shell side of the exchange apparatus at a flow rate of 6 liters per minute and no fluid flow on a tube side of the exchange apparatus, said hot oil is at a temperature of 140°C and pressure of 50 psig.

Claim 19 (currently amended): The exchange device of claim 16 where [[an]] the outer layer of the co-extruded thermoplastic hollow conduits includes a thermally conductive material.

Claim 20 (currently amended): The exchange apparatus of claim 16 where the co-extruded thermoplastic hollow conduits are made from perfluorinated thermoplastics, said co-extruded hollow conduits have an inner perfluorinated thermoplastic layer thermally bonded fused to an outer perfluorinated thermoplastic layer, the outer perfluorinated thermoplastic layer fusing fused with said first or second thermoplastic resin in the exchange device, said first or second thermoplastic resins are perfluorinated thermoplastics; said perfluorinated thermoplastic resin fused with the thermoplastic housing or said first and second sleeves that are made from perfluorinated thermoplastic.

Claim 21 (currently amended): A method of treating a fluid comprising:

flowing a first fluid to be treated on a first side of one or more thermoplastic hollow conduits in an exchange device of claim 7 or claim 16, and

flowing ~~[[an]]~~ a second fluid on a second side of the thermoplastic hollow conduits in the exchange device of claim 7 or claim 16; and

~~to transfer~~ transferring mass, energy, or a combination of these ~~[[is]]~~ between the first fluid and the second fluid through a wall between ~~[[a]]~~ said first side of said one or more thermoplastic hollow conduits and ~~[[a]]~~ said second side of ~~[[the]]~~ said one or more thermoplastic hollow conduits.

Claim 22 (previously presented): The method of claim 21 wherein thermal energy is transferred between the first fluid and the second fluid.

Claim 23 (previously presented): The method of claim 21 wherein said wall between the first side and the second side of the thermoplastic hollow conduits is non-porous.

Claim 24 (previously presented): The method of claim 21 wherein said wall between the first side and second side of the thermoplastic hollow conduits is porous.

Claim 25 (currently amended): An apparatus comprising:
an exchange device claim 7 or claim 16; and

a source of exchange fluid connected to a first fluid inlet of the exchange device and a source of process fluid connected to a second fluid inlet of the exchange device, the first fluid inlet and the second fluid inlets inlet separated by the thermoplastic hollow conduits~~[[,]]~~; and

a fluid controller fluidly connected to ~~[[an]]~~ a second fluid outlet in fluid communication with the second fluid inlet, the fluid controller provides conditioned fluid to one or more substrates treated by the apparatus.

Claim 26 (previously presented): The apparatus of claim 25 wherein the second fluid outlet in fluid communication with the second fluid inlet provides conditioned fluid to a tank containing one or more substrates.

Claim 27 (original): The apparatus of claim 25 wherein the fluid controller is a pump, a dispense pump, or a liquid flow controller.

Claim 28 (original): The apparatus of claim 25 wherein the exchange fluid is a source of temperature controlled fluid.

Claim 29 (currently amended): The apparatus of claim 25 wherein the one or more substrates ~~substrate to be treated by the apparatus~~ includes silicon.

Claims 30-36 (canceled)

Claim 37 (new): The exchange device of claim 20 that maintains fluid integrity for 24 hours with hot oil fed into a shell side of the exchange apparatus at a flow rate of 6 liters per minute and no fluid flow on a tube side of the exchange apparatus, said hot oil is at a temperature of 140°C and pressure of 50 psig.

Claim 38 (new): The exchange device of claim 37 that includes grooves on said interior surfaces of said sleeves or said interior surfaces of said housing.

Claim 39 (new): The exchange device of claim 11 wherein the thermoplastic hollow conduits are perfluorinated co-extruded hollow conduits, the thermoplastic resin is a perfluorinated thermoplastic, and the thermoplastic housing or said first and second sleeves are a perfluorinated thermoplastic.

Claim 40 (new): The exchange device of claim 18 wherein the thermoplastic hollow conduits are perfluorinated co-extruded hollow conduits with a perfluoroalkoxy (PFA) inner layer and a perfluoromethylalkoxy (MFA) outer layer, the thermoplastic resin is a perfluorinated thermoplastic, and the thermoplastic housing or said first and second sleeves are a perfluorinated thermoplastic.